Remarks

The Applicants have amended the Specification to provide proper idiomatic English and to correct a subheading.

The Applicants acknowledge the rejection of Claims 1 - 11 and 13 - 23 under 35 U.S.C. §112. The Applicants have amended Claim 1 to recite "polyethylene terephthalate" in accordance with the Examiner's helpful suggestion. Also, the appropriate claims have been amended to include the proper language with respect JIS L0804. The Applicants also enclose a copy of JIS L0804, and a copy of The Standardization and Analysis of Hand Evaluation for the Examiner's convenience.

The term "denim-like" has been deleted from all of the claims in accordance with the Examiner's helpful suggestions. The Applicants accordingly respectfully request withdrawal of the 35 U.S.C. §112 rejection.

The Applicants have also amended Claim 1 to contain the subject matter of Claims 4, 11 and 12. Claims 4, 11 and 12 have accordingly been cancelled.

The Applicants acknowledge the 35 U.S.C. §102 rejection of Claims 1 - 10, 19 and 20 under 35 U.S.C. §102 as being anticipated by Beaty. In as much as Claim 1 has been amended to contain the subject matter of Claims 11 and 12, the Applicants respectfully submit that the rejection based on Beaty is now moot. Withdrawal of that rejection is respectfully requested.

The Applicants acknowledge the rejection of Claims 1 - 3, 8 - 17 and 19 under 35 U.S.C. §103 as being obvious over Hayashi. In as much as Claim 1 has been amended to include the subject matter of Claim 4, the Applicants respectfully submit that the rejection is now moot. Withdrawal of the 35 U.S.C. §103 rejection based on Hayashi is respectfully requested.

In light of the forgoing, the Applicants respectfully submit that the entire application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,

T. Daniel Christenbury
Reg. No. 31,750

TDC:ks
(215) 656-3381

THE STANDARDIZATION AND ANALYSIS OF HAND EVALUATION

(2nd. Edition)

SUEO KAWABATA

DR., Associate Professor, Department of Polymer Chemistry, Kyoto University, Kyoto, 606, and the Chairman of the Hand Evaluation and Standardization Committee, The Textile Machinery Society of Japan.

July 1980

THE HAND EVALUATION AND STANDARDIZATION COMMITTEE

The Textile Machinery Society of Japan.
Osaka Science & Technology Center Bld., 8-4, Utsubo-1-chome,
Nishi-ku, OSAKA 550 Japan

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CONTENTS

5. KES-F system and KES-FB system

In 1973, the KES-F system was completed by the present author. The KES-F system (Kawabata's evaluation system for fabrics) is consisted of four machine-blocks such as Table 4-1. The KES-FB which has been developed recently is also same system as KES-F system shown in Table 4-1, and some improvements have been made in the mechanism of each of the machines.

Table 4-1 KES-F System

Machine block	Use	Characteristic values measured
KES-F-1	Tensile and shearing testing	*LT, WT, RT, G, 2HG, 2HG5*
KES-F-2	Pure bending testing	*B, 2HB*
KES-F-3	Compressional testing	*LC, WC, RC, T*
KES-F-4	Surface testing	*MIU, MMD, SMD*

Remark: KES-FB System is also consisted of the four machines same as above.

Each of the machine blocks is connected with a main-amp-block shown in Fig. 4-12 and, if necessary, with a computing block as shown in Fig. 4-11. We can set up the system also such that these four machine blocks possess one main-amp-block and one computing block in common.

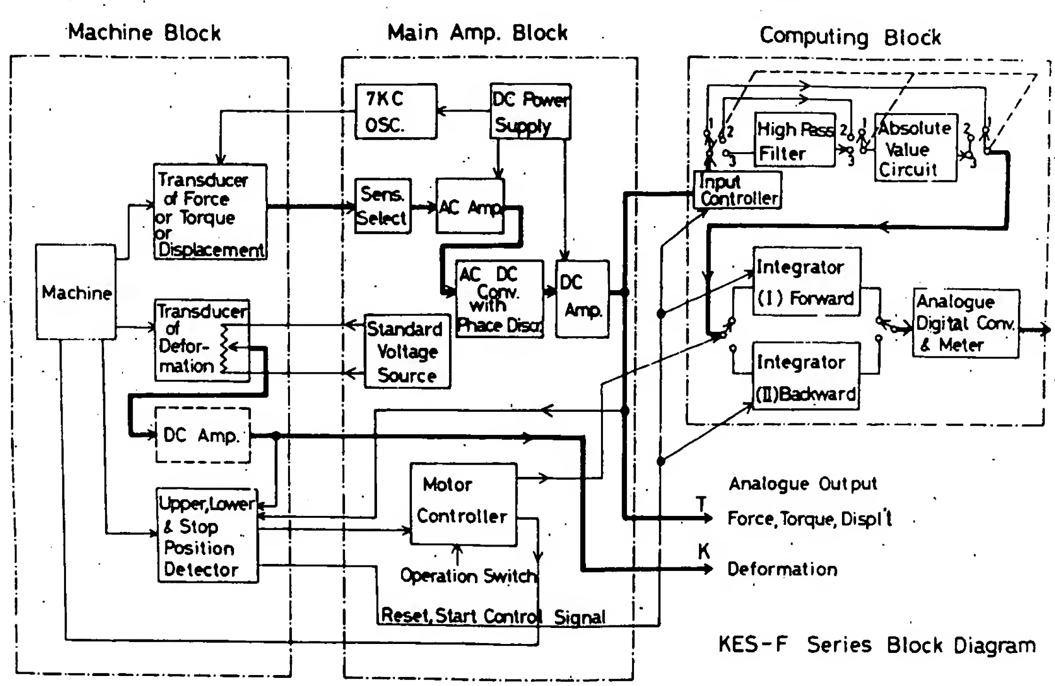


Fig. 4-11 KES-F and KES-FB systems. Thick line shows the flow of the signal.

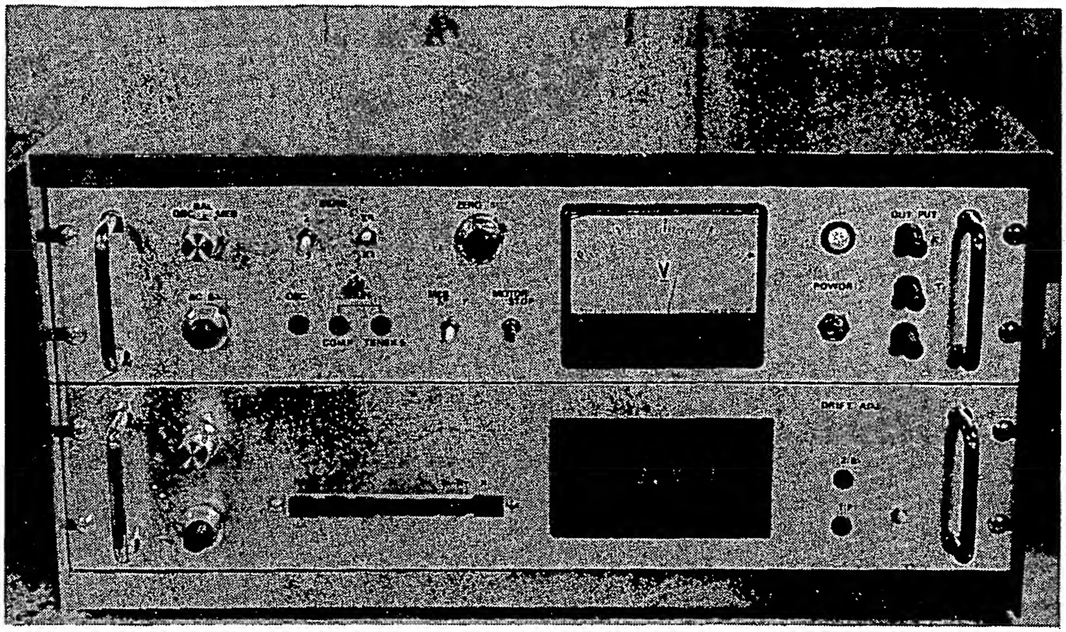
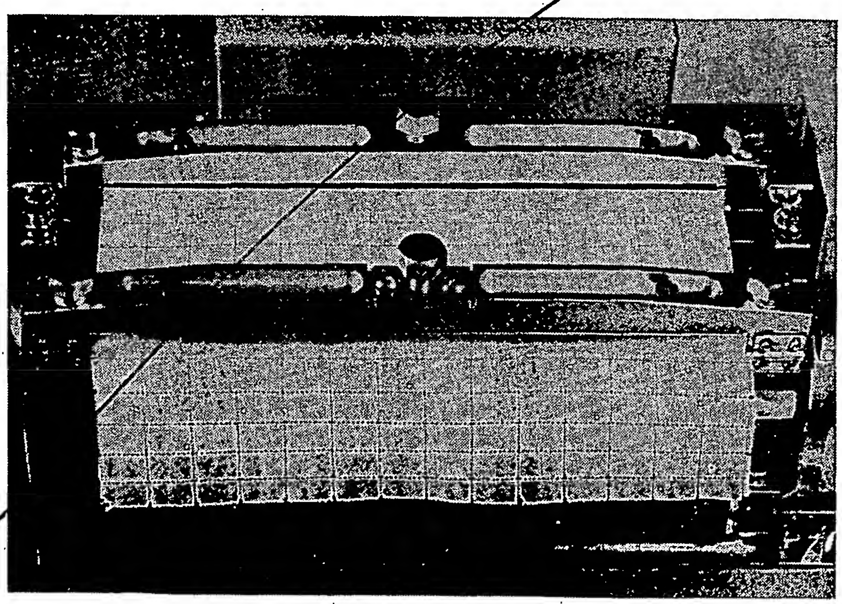


Fig. 4-12 Amp. and computing block of KES-F and KES-FB systems.

~~1) KES-FB1~~

Fig. 4-13 is the appearance of KES-FB-1. A specimen is cramped by two chucks of 20 cm long, as shown in the figure. One of the chucks is mounted on a sliding base, and stretchs the specimen by the movement of the sliding base to backward direction. Tensile force is detected by measuring the torque of the drum and tensile strain by the displacement of the sliding base as shown in Fig. 4-14. The deformation applied becomes approximately "strip biaxial deformation".

The force-strain curve obtained in this apparatus is shown in Fig. 4-15. The values of



~~Fig. 4-13 Tensile testing by KES-FB1.~~

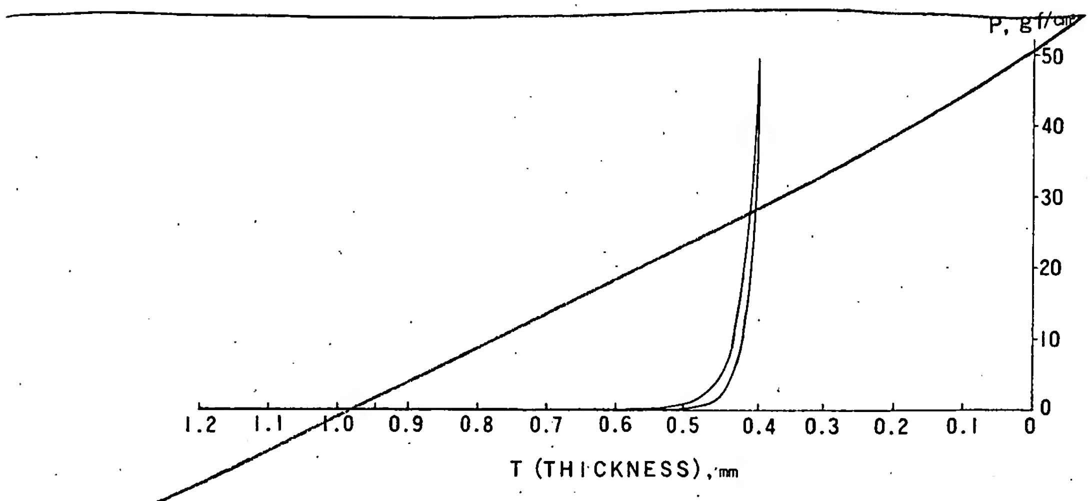


Fig. 4-25 Recorded curve by KES-FB3.

4) KES-FB4

The measurements of the surface roughness and surface friction are shown in Fig. 4-26 (a). The specimen is moved from left to right by a rotating drum on which one end of the specimen is fixed and then from right to left after that. The another end of the specimen is crumped by a swing lever to give tension on the specimen. The detector of the roughness coming down from the upper part touches on the specimen under the standardized condition. The up and down displacement of this detector caused by roughness of the

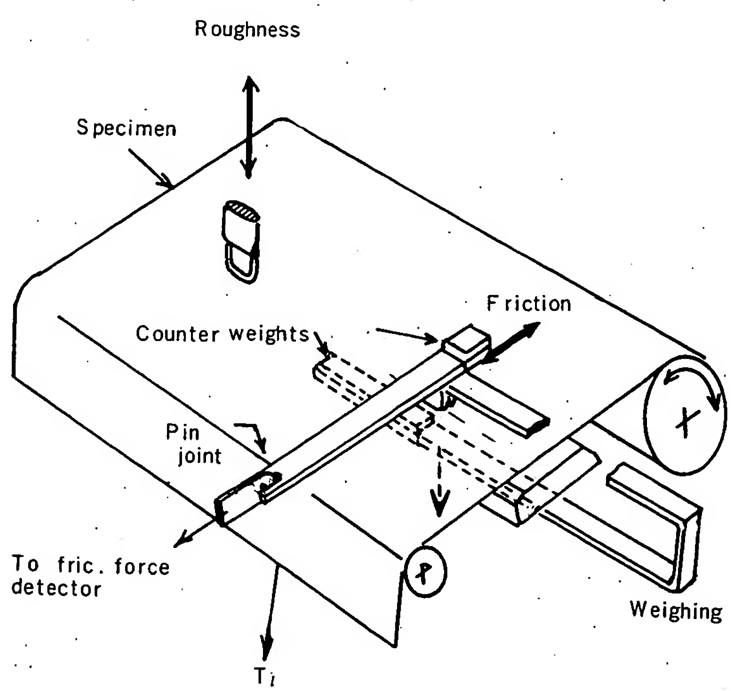
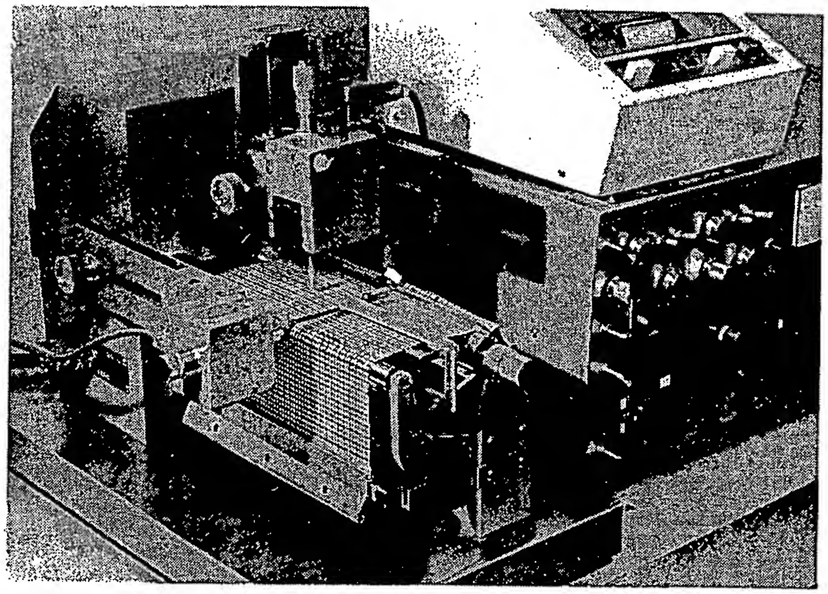
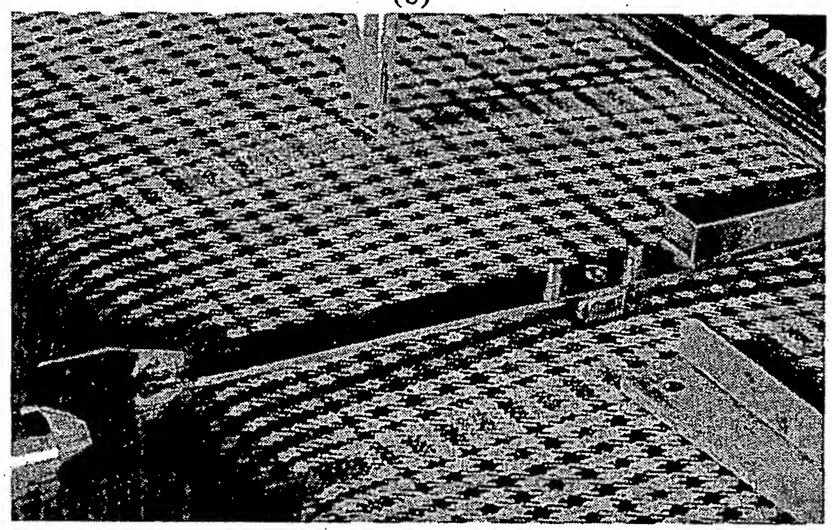


Fig 4-26 (a) Principle of the surface testing.



(b)



(c)

Fig.4-26 (b) and (c) Surface tester, KES-FB4. The surface roughness and surface friction are being measured at same time. Appearance (b), close up of the contact portion (c). The weight lever is dismounted from the friction contactor to show the contact portion clearly. This photo is taken from same angle as drawing of Fig.4-26 (a).

specimen is transduced tc the electric signal by a linear-transformer put at up-ends of the detector. The signal from the transducer is passed the filter having prescribed frequency response and integrated to compute *SMD*.

Fig. 4-26 (a) shows also the testing of surface friction using same apparatus with a different detector. The detector (front side) is connected by a free joint with the end of the transducer which detects the frictional force picked up by the detector. The surface of the detector is shown in Fig. 4-27. The contact pressure is given by a stable

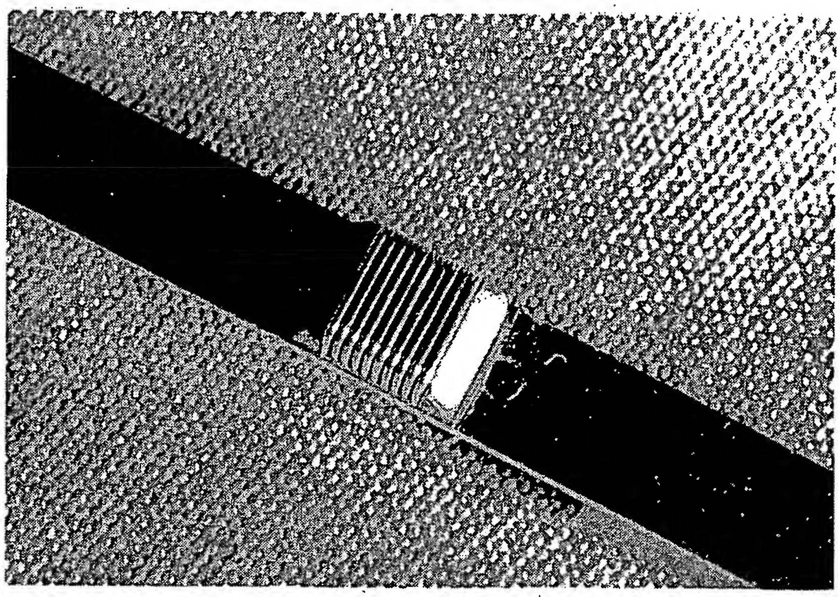


Fig. 4-27 Surface of the contactor used for surface friction testing.

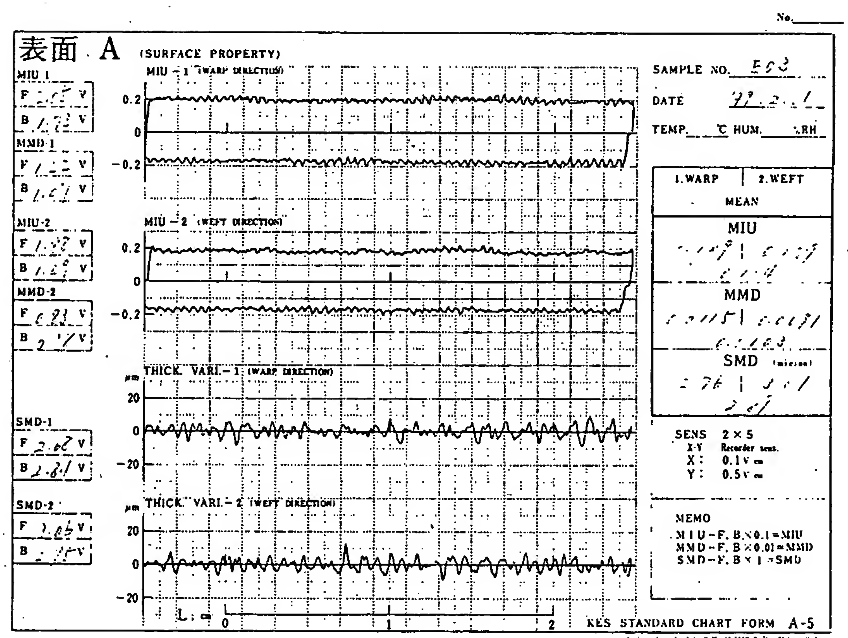


Fig. 4-28 Recorded curves of surface friction (upper two curves), two curves corresponds to warp and weft directions respectively and each curve is consisted of going and returning processes. Recorded curves of surface roughness (lower two).

balance where its gravitational center lies lower than the contact surface. Fig. 4-28 is the recorded curves of the friction and the roughness respectively. *MIU, MMD* and *SMD* of these curves are calculated in the computing block and indicated their values by digital meter.

Now this system has been used in many companies and laboratories in Japan. The first system is placed in Nara Women's University and Dr. Niwa who is a staff of the university has measured many samples of which hand values have been evaluated by experts in the committee and obtained useful data for the analysis of the expert's hand as described next chapter. The following leading textile companies, Toray Industries, INC., Kuraray Co., LTD., Kanebo Co., LTD., and Kao Soap Co., LTD. also assisted the measurement by using their KES-F systems in the earliar stage of this research.

~~6. Characteristic values of the fabrics commercially produced for men's suit.~~

The histograms from Fig. 4-29 to Fig. 4-45 show the distribution of each of the sixteen characteristic values, including those of ϵ_m as a related value, for the samples selected as following manner.

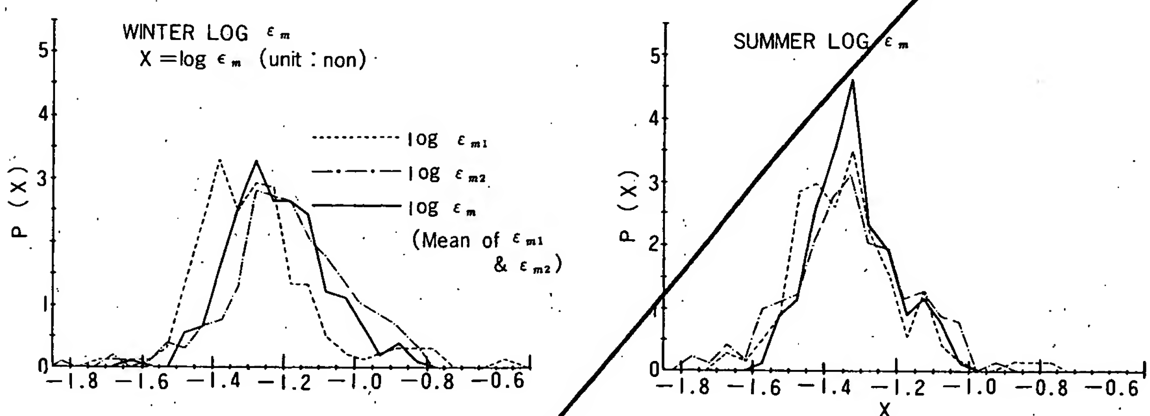


Fig. 4-29 Distribution of ϵ_m.

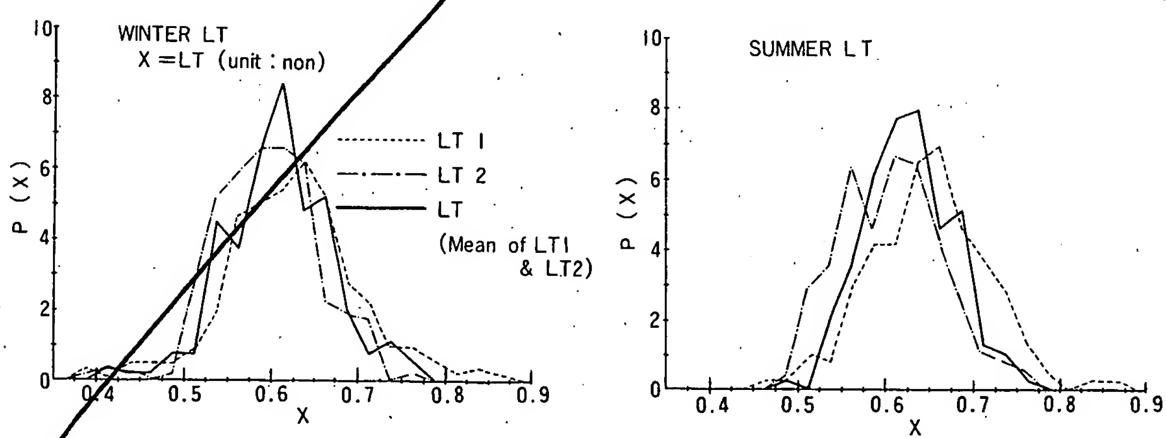


Fig. 4-30 Distribution of LT.

UDC 535.65:535.68:620.191.7

JIS

This standard was revised in 2, 1994

JAPANESE INDUSTRIAL STANDARD

Grey Scale for Assessing Change in Colour

JIS L 0804-1983

Translated and Published

by

Japanes Standards Association

Translation without guarantee
In the event of any doubt arising, the original standard in Japanese is to be evidence

UDC 535.65:535.68:620.191.7

JAPANESE INDUSTRIAL STANDARD | J I S

Grey Scale for Assessing Change in Colour | L 0804-1983

1. Scope

This Japanese Industrial Standard specifies the grey scale to be used as the standard for assessing visually change in colour of test specimens yielded by colour fastness test, hereinafter referred to as the "grey scale".

2. Summary

This standard gives the requirements for the construction, dimensions and quality of the grey scales and provides the colour measurement and the inspection thereof.

3. Definition

The principal terms used in this standard are as defined below.

(1) achromatic colour Colour without hue; as defined in JIS Z 8105.

(2) colour difference based on $L^*a^*b^*$ system (ΔE^*_{ab}) Value obtained by colour measurement made in accordance with 4. or 5. of JIS Z 8722 and by calculation thereafter made in accordance with 6.1 of JIS Z 8730 using the values $X_{10}Y_{10}Z_{10}$ under the standard illuminant D_{65}.

(3) colour difference based on Adams-Nickerson's colour difference formula (ΔE_{AN}) Value obtained by colour measurement made in accordance with 4. or 5. of JIS Z 8722 and by calculation thereafter made in accordance with 6.3.1 of JIS Z 8730 using the values XYZ under the standard illuminant C.

Applicable Standards:

JIS Z 8105-Glossary of Colour Terms

JIS Z 8721-Specification of Colours According to Their Three Attributes

JIS Z 8722-Methods of Measurement for Colour of Reflecting or Transmitting Objects

JIS Z 8730-Method for Specification of Colour Differences for Opaque Materials

Reference Standard:

ISO 105/A.02 Grey scale for assessing change in colour

4. Colour of Chips

4.1 The chips a_5 and b_5 of rating No. 5 and the chips a_{4-5}, a_4, a_{3-4}, a_3, a_{2-3}, a_2, a_{1-2} and a_1 of rating Nos. 4 - 5 to 1, shown in Fig. 1, shall be of achromatic colour, and shall, at the same time, have 12 ± 1 % in value Y of colour stimulus specification.

4.2 The chips b_{4-5}, b_4, b_{3-4}, b_3, b_{2-3}, b_2, b_{1-2} and b_1 of rating Nos. 4 - 5 to 1 shall be of achromatic colour showing more reflectance than that of each contiguous chip.

4.3 There shall be presented the colour difference specified in Table 1 or 2 between two chips consisting each pair of rating Nos. 5 to 1.

4.4 All chips shall have no fluorescence and shall scarecely show gloss and change with the passage of time.

4.5 The surface of the body other than that of chips as well as that of mask shall be approximately N 2.5 in specification of achromatic colour specified in JIS Z 8721.

Table 1. Colour Difference Between Two Chips of Each Rating (ΔE^*_{ab})

Rating (No.)	Colour difference
5	0 +0.2
4 — 5	0.8 ± 0.2
4	1.7 ± 0.3
3 — 4	2.5 ± 0.35
3	3.4 ± 0.4
2 — 3	4.8 ± 0.5
2	6.8 ± 0.6
1 — 2	9.6 ± 0.7
1	13.6 ± 1.0

Table 2. Colour Difference Between Two Chips of Each Rating (ΔE_{AN})

Rating (No.)	Colour difference
5	0 +0.2
4 — 5	0.75 ± 0.2
4	1.5 ± 0.2
3 — 4	2.25 ± 0.2
3	3.0 ± 0.2
2 — 3	4.25 ± 0.3
2	6.0 ± 0.5
1 — 2	8.5 ± 0.7
1	12.0 ± 1.0

5. Construction, Shape and Dimensions

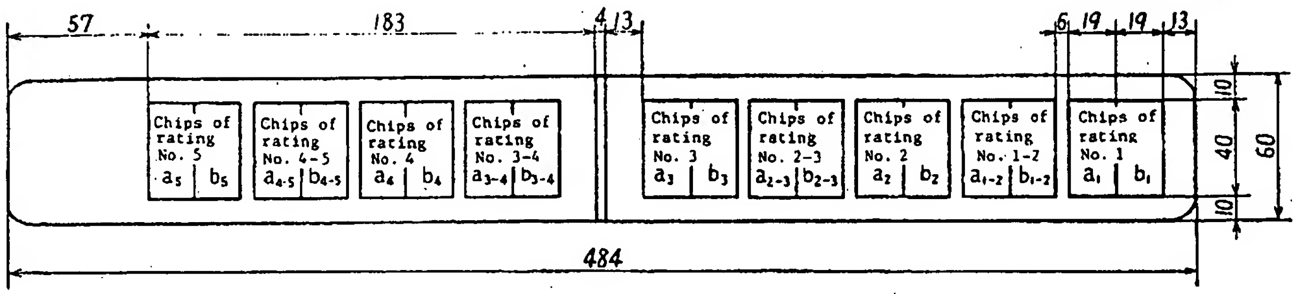
5.1 The grey scale shall consist of a plate of body and its mask.

5.2 There shall be presented nine-stepped colour difference of rating Nos. 5 to 1 with nine pairs of colour chips on the surface of the body, as shown in Fig. 1.

5.3 The colour chips showing a rating shall consist of a pair of colour chips a and b placed contiguously to each other.

Fig. 1. Body

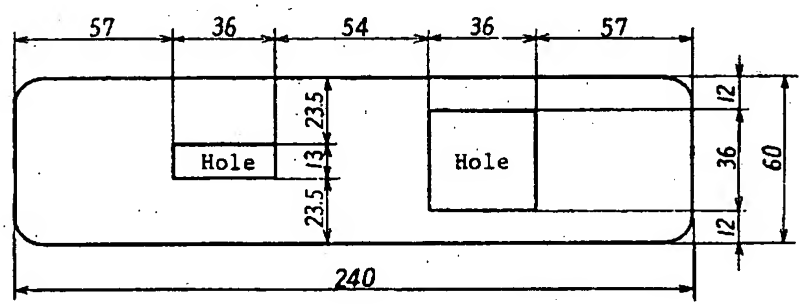
Unit: mm



5.4 The shape and dimensions of the mask shall be as specified in Fig. 2.

Fig. 2. Mask

Unit: mm



6. Appearance

The grey scales shall be free from such defects as enumerated below.

(1) Unevenness of colour on the chips,

(2) Staining and rubbing flaw on the chip surface,

(3) Immoderate conspicuousness, obscurity or overlap along the contact line of two chips of a rating,

(4) Immoderateness or unevenness of colour and condition on the surface of the mask, and

(5) Presence of any colour, different from that of the mask surface, at the cut section surrounding the holes.

7. Colour Measurement

The colour measurement to be made for the chips shall follow the method specified in 4. or 5. of JIS Z 8722.

8. Inspection

The inspection of the grey scales shall be made on the requirements specified in 4., 5. and 6. above.

Reference: The grey scales for assessing change in colour are available at Japanese Standards Association.

L 0804-1983
Edition 1

Japanese Text

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Technical Committee on Methods of Test for Colour Fastness

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